

## Catalogue of American Amphibians and Reptiles.

Ernst, C.H. and J.F. McBreen. 1991. *Terrapene*.

***Terrapene* Merrem**  
**Box Turtles**

*Didicla*: Rafinesque, 1815:75. *Nomen nudum*. Rafinesque, 1832:64 assigned species *Testudo clausa* Gmelin, 1789, and *Testudo odorata* Latreille (in Sonnini and Latreille, 1801) to genus, but did not designate a type-species. Type-species, *Testudo clausa* Gmelin, 1789 [= *Terrapene carolina* (Linnaeus, 1758)], subsequent designation by Brown, 1908.

*Monoclista*: Rafinesque, 1815:75. *Nomen nudum*. Type-species, *Monoclista kentuckensis* Rafinesque, 1822:3 [= *Terrapene carolina* (Linnaeus, 1758)], by monotypy.

*Terrapene* Merrem, 1820:27. Type-species, *Testudo clausa* Gmelin, 1789 [= *Terrapene carolina* (Linnaeus, 1758)], subsequent designation by Bell, 1825:300.

*Therapene*: Schinz, 1822:13. *Lapsus calami*.

*Cistuda* Fleming, 1822:270. Type-species, "box turtle."

*Cistudo*: Say, 1825:214. Substitution for *Cistuda* Fleming, 1822.

*Tetrapene*: Haworth, 1825:373. *Lapsus calami*.

*Cistula*: Gray, 1825:211. *Lapsus calami*.

*Terrapene*: Gray, 1825:211. *Lapsus calami*.

*Emys*: Wagler, 1830:138. In part.

*Emys* (*Cistuda*): Bonaparte, 1830:376.

*Pyxidemys* Fitzinger, 1835:114. Type-species, *Testudo clausa* Gmelin, 1789 [= *Terrapene carolina* (Linnaeus, 1758)], subsequent designation by Fitzinger, 1843:29.

*Pyxidemis*: Agassiz, 1843:38. Emendation.

*Emyoides*: Gray, 1844:27. Type-species, *Emys kinosternoides* Gray, 1831 [= *Terrapene carolina* (Linnaeus, 1758)] by monotypy.

*Terrapenne*: Gistel, 1848:98. *Lapsus calami*.

*Cistudo* (*Onychotria*) Gray, 1849:17. Type-species, *Cistudo* (*Onychotria*) *mexicana* Gray, 1849 (= *Terrapene carolina mexicana* Gray, 1849:17), by monotypy.

*Onychotria*: Strauch, 1862:27. Elevation to genus.

*Didicla*: Boulenger, 1889:33. *Lapsus calami*.

*Onychotria*: Herrera, 1890:330. *Lapsus calami*.

*Pariemys* Cope, 1895:757. Type-species, *Terrapene bauri* Taylor, 1895 (= *Terrapene carolina bauri* Taylor, 1895), by monotypy.

*Toxaspis* Cope, 1895:757. Type-species, *Cistudo major* Agassiz, 1857 [= *Terrapene carolina major* (Agassiz, 1857)], by monotypy.

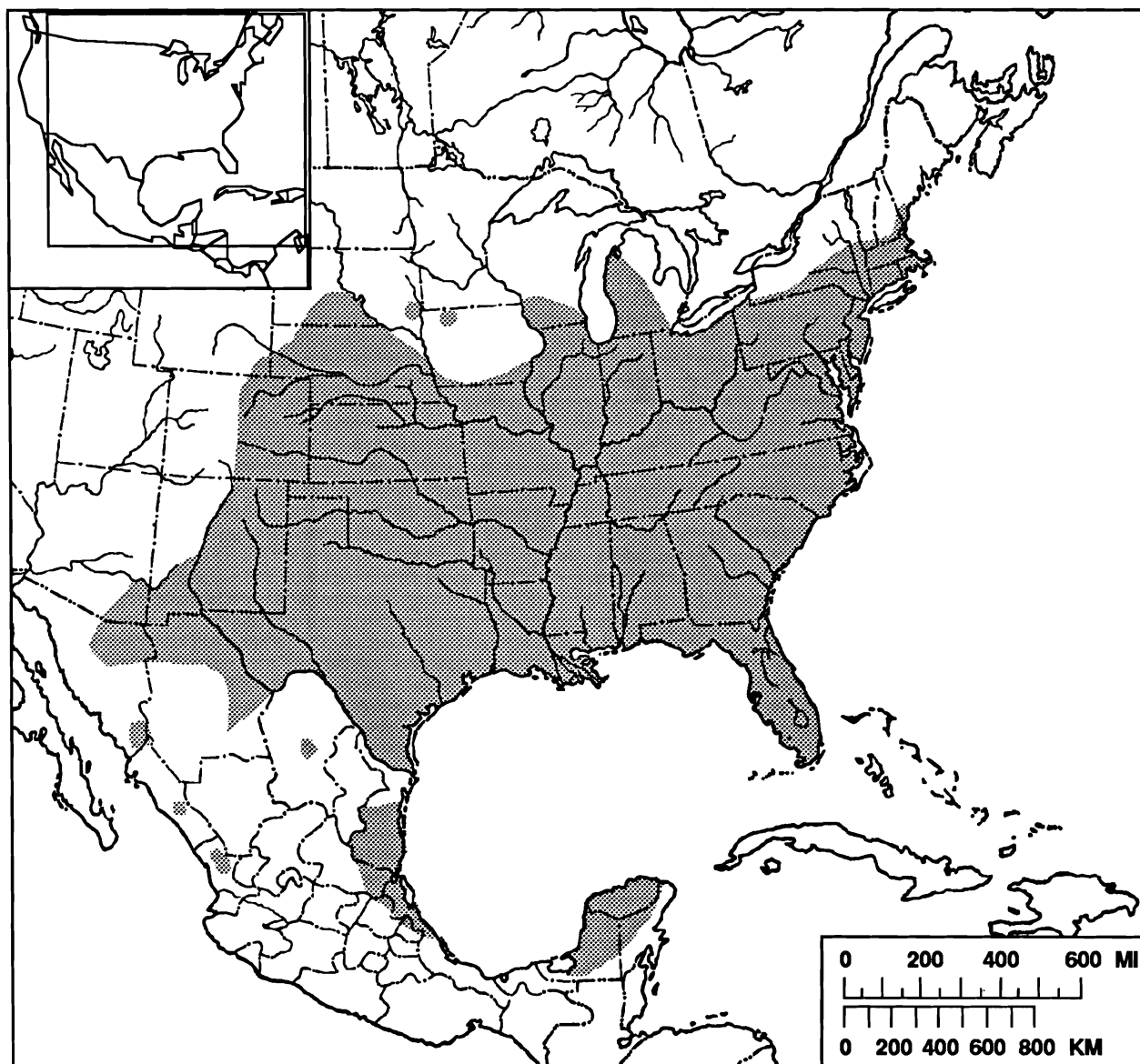
*Cistudos*: Herrera, 1901:36. Emendation.

*Terepene*: Breder, 1924:63. *Lapsus calami*.

*Terrapene* (*Emyoides*): Lindholm, 1929:282. See Comment.

*Terrapene* (*Terrapene*): Lindholm, 1929:282. See Comment.

*Terrepene*: Slevin, 1934:29. *Lapsus calami*.



Map. Distribution of the genus *Terrapene*.

*Emydoides*: Pritchard, 1975:17. *Lapsus calami*.

*Terpene*: Smith and deCarvalho, 1985:232. *Lapsus calami*.

• **Content.** Four species are recognized: *Terrapene carolina*, *T. coahuila*, *T. nelsoni*, and *T. ornata*.

• **Definition.** Adults may grow to 216 mm in carapace length; in *Terrapene carolina* and *T. coahuila* males are larger than females and in *T. ornata* females are larger. The carapace is domed with an unserrated, sometimes flared, posterior rim. A medial keel is well developed in *T. carolina*, low and indistinct in *T. coahuila* and *T. nelsoni*, and absent in *T. ornata*. Vertebral scutes are wider than long. Growth annuli may sculpture the carapacial surface in young turtles, but are worn smooth with age. Neural bones are hexagonal with the anterior side shortest; the 8th is absent allowing the corresponding costal bones to touch. The dorsal rib heads are normal. Ground color of the carapace varies from black or dark brown to tan or yellow. A pattern of yellow, orange, or brown radiating stripes, blotches, or spots is usually present (see species accounts). The plastron has a single hinge between the pectoral and abdominal scutes, creating an anterior and a posterior lobe. The plastron articulates to the carapace through ligamentous attachments; the bridge and its corresponding buttresses are absent, permitting both lobes to move and entirely close the shell. The entoplastron is intersected by the humero-pectoral seam. The skull is short with an incomplete zygomatic arch. The pterygoid touches the basioccipital. The jugal is tapered to a point ventrally and does not touch the pterygoid. The lower parietal process is well separated from the palatine by the pterygoid. The frontal bone barely enters the orbit. Orbitonasal foramina are small. Triturating surfaces are narrow and lack ridges. The head is covered with smooth skin, and coloration and pattern are variable (see species accounts). The cervical vertebrae are not elongated, and the 2nd and 8th are the shortest. The toes are partially webbed, with either three or four toes on each hind foot. In *Terrapene nelsoni* and *T. ornata*, males have the ability to extend the medial hind toe inward to aid in clasping the female during copulation; *T. carolina* and *T. coahuila* lack this ability.

• **Descriptions and Illustrations.** References to external features are listed in the species accounts; other selected references with descriptions or illustrations follow: general descriptions (Pritchard, 1979; Smith and Smith, 1980; Ernst and Barbour, 1989); karyotype (Stock, 1972; Killebrew, 1977); embryology (Ewert, 1979, 1985); skeleton (Ruckes, 1929, 1937; Williams, 1950; Milstead, 1969; Zug, 1971; Ernst and Barbour, 1972; Murphy, 1976; Gaffney, 1979; Long and Rose, 1989); scute annuli (Zangerl, 1969); penis (Zug, 1966); sexual dimorphism (Wilbern and Ingold, 1983); feeding behavior (Carpenter, 1979); courtship (Carpenter and Ferguson, 1977).

• **Distribution.** The genus *Terrapene* is found in temperate and tropical North America from Maine south to the Florida Keys, west to Michigan, Illinois, southern Wisconsin, Iowa, South Dakota, and southeastern Wyoming, and south to Texas, northern Chihuahua, northeastern Sonora, and southeastern Arizona. Two Mexican species occupy discontinuous ranges, Tamaulipas to northern Veracruz and Quintana Roo, and Campeche and Yucatán. Isolated populations occur in New York, Coahuila, and southern Sonora.

• **Fossil Record.** Most fossil *Terrapene* have been assigned to the Recent species *T. carolina* or *T. ornata* (Barbour and Stetson, 1931; Oelrich, 1953; Milstead, 1967, 1969; Milstead and Tinkle, 1967); see those accounts for details. However, a newly discovered Miocene fossil from the Barstovian Myers Farm Fauna, Webster County, Nebraska has several characters resembling *T. coahuila* that do not seem to occur in other living species (Holman and Corner, 1985). No taxonomic assignment has been made of this material, but it may represent a new fossil species. Fossils of *Terrapene* date from the Miocene Barstovian of Nebraska (two sites, Holman and Corner, 1985; Holman, 1987) to the Pleistocene Rancholabrean (Milstead, 1969).

• **Pertinent Literature.** A summary of the pertinent papers on *Terrapene coahuila*, *T. nelsoni*, and *T. ornata* published since Ward (1978) and Iverson (1982a, 1982b), and those concerned with the genus *Terrapene* is presented. Papers pertaining to *T. carolina* are presented in that account. References are listed below by topics. A general review of *Terrapene* biology is in Harless and Morlock (1979); other general accounts are Murphy (1976), Bartlett (1979), and Smith

and Smith (1980). Evolution and systematics were treated by Bell (1825), Hildemann (1962), Frair (1962, 1963), McDowell (1964), Milstead and Tinkle (1967), Milstead (1969), Bramble (1974), Mao et al. (1987) and Yin et al. (1989). Zoogeography and distribution were discussed in Savage (1966), Moodie and Van Devender (1979), and Iverson (1986). The karyotype was presented by Stock and Mengden (1975), Bickham and Baker (1976), Roy (1977), and Bickham (1981). Parasitology was discussed by Ernst and Ernst (1977, 1979). Hybridization was treated by Clark (1935), Mertens (1950, 1956), Smith (1955), Blaney (1968), and Ward (1968). Sexual dimorphism was discussed in Wilbern and Ingold (1983). Morphology was treated by Ruckes (1929, 1937), Haines (1946), Balmer (1951), Green (1951), Hebard and Charipper (1955), Parsons (1960), Richmond (1964), Sehe (1965), Zug (1966, 1971), Helmy and Hack (1967), Thiruvathukal (1968), Haines (1969), Zangerl (1969), Andres (1970), Baird (1970), Bockman (1970), Clark et al. (1970), Gabe (1970), Leonard and Shields (1970), Lynn (1970), Saint Girons (1970), Polver and Novelli (1971), Schumacher (1973), Walker (1973), Bramble (1974), Fox (1977), Parsons and Cameron (1977), Quay (1979), Starck (1979), and Lillywhite and Maderson (1982). Embryology was discussed by Nelson (1953), Ewert (1979, 1985), Raynaud (1985), Raynaud and Pieau (1985), and Packard and Packard (1988). Immunology was treated by Cooper et al. (1985), physiology by Anderson and Wilbur (1948), Altland and Thompson (1958), Musacchia and Chladek (1961), Roddie (1962), Schwartz and Kaplan (1962), Adler and Small (1963), Dodge and Folk (1963), Robinson and Schmidt-Nielsen (1963), Dozy et al. (1964), Payne and Burke (1964), Quay and Wilhoft (1964), Sullivan and Riggs (1967), Helmy et al. (1969), Morgan and Singh (1969), Baze and Horne (1970), Dessauer (1970), Graziadei and Tucker (1970), Klicka and Mahmoud (1970), Manley (1970), Boyd and Chew (1971), Hertzler (1972), Kaplan et al. (1974), Mangelsdorff and Hauty (1974), Bennett and Dawson (1976), Bentley (1976), Jackson et al. (1976), Spotila (1976), Wood and Lenfant (1976), Richter et al. (1977), Skoczylas (1978), Belekova (1979), Avery (1982), Bennett (1982), Lillywhite and Maderson (1982), Mautz (1982), Minnich (1982), Tonosacki and Tucker (1982), Magliola (1984), Karasov et al. (1985), and Skene et al. (1989). Hibernation was discussed by Humbert (1978) and Gregory (1982), ecology by Iverson (1982c) and Wilbur and Morin (1988), and behavior by Greene (1988). Recent literature on *Terrapene coahuila* includes Carpenter and Ferguson (1977), Ewert (1979), Smith and Smith (1980), Avery (1982), Iverson (1982c), Guajardo-Martinez (1984), Murphy and Mitchell (1984), Tonge (1987), and Greene (1988); *Terrapene nelsoni* was treated in Ewert (1979) and Smith and Smith (1980); and Degenhardt and Christiansen (1974), Blair (1976), Punzo (1976), Rogers (1976), Burghardt (1977), Carpenter and Ferguson (1977), Moodie and Van Devender (1978), Carpenter (1979), England (1979), Ewert (1979), Glass et al. (1979), Hutchison (1979), Metcalf and Metcalf (1979), Barten (1980), Smith and Smith (1980), Thomasson (1980), Myers et al. (1981), Andrews (1982), Avery (1982), Bartholomew (1982), Bennett (1982), Costanzo and Parker (1982), Iverson (1982c), Parker (1982), Wilbern (1982), Wilbern and Ingold (1983), Adams and deCarvalho (1984), Long (1984), Ewert (1985), Metcalf and Metcalf (1985), Packard et al. (1985), Smith and deCarvalho (1985), Brunson (1986), Black (1987), Greene (1988), Karasov et al. (1988), Packard and Packard (1988), Rose et al. (1988), Long and Rose (1989), McAllister and Upton (1989), Doroff and Keith (1990) and Grobman (1990) presented information on *T. ornata*.

• **Key to Species.** Catalogue account numbers are given in parentheses after the species name.

1. Carapace with at least a low medial keel ..... 2  
Carapace with no medial keel ..... 4
2. Plastral hinge opposite the 5th marginal scute ..... 3  
Plastral hinge opposite the 6th marginal scute or the seam separating the 5th and 6th marginal scutes ..... *T. nelsoni* (289)
3. Carapace height usually > 44 % of the carapace length; intergular seam usually < 45 % of the anterior plastral lobe length; either 3 or 4 hind toes present ..... *T. carolina* (512)  
Carapace height usually < 44 % of the carapace length; intergular seam length usually > 45 % of the anterior plastral lobe length; always 4 hind toes ..... *T. coahuila* (288)
4. Plastron patterned with light radiating stripes .. *T. ornata* (217)  
Plastron unicolored or with small light dots or dark seam bor-

ders ..... 5

5. Plastron unicolored or with dark seam borders; interfemoral seam < 15 % of the posterior plastral lobe length ..... *T. coahuila* (288)  
Plastron with small yellow spots or streaks; interfemoral seam usually > 16 % of the posterior plastral lobe length ..... *T. nelsoni* (289)

• **Etymology.** The feminine noun *Terrapene* is derived from the North American Algonquin Indian word for turtle.

• **Comment.** The names *Didicla* and *Monoclista* appeared first in a list of turtle genera with no accompanying descriptions by Rafinesque (1815). In 1822, Rafinesque described the species *Monoclista kentuckensis* [= *Terrapene carolina*], thus it became the type-species of *Monoclista* by monotypy. Rafinesque used *Monoclista* again in 1832, when he mistakenly listed "*T. retziana*" as an example. *Testudo retziana* is an emendation of *Testudo retzii* Daudin, 1802:174, which is a junior synonym of *Testudo scorpionoides* Linnaeus, 1766 [= *Kinostemon scorpionoides*]. Rafinesque's intention for this assignment is unclear. Possibly he misunderstood Daudin's description, believing it to be that of a box turtle (*Terrapene*). The reference to a single-folding hinge, which is the meaning of *Monoclista*, more accurately represents the box turtles of the genus *Terrapene* than the double-hinged species of *Kinostemon*. Also in 1832, Rafinesque listed "*T. clausa* [= *Terrapene carolina*, *odorata* [= *Sternotherus odoratus*]]" as species of *Didicla*. Later Brown (1908) designated *T. clausa* Gmelin, 1789 [= *Terrapene carolina carolina*] as the type-species of the *Didicla*.

In 1929, Lindholm created two subgenera (which he referred to as Sections) within the genus *Terrapene*. Within the first, *Emyoides*, he placed the species *Emys kinosternoides* Gray, 1831 and the genus *Onychotria* Strauch, 1862. In the second, *Terrapene*, he assigned the genera *Cistudo* Say, 1825, *Didicla* Rafinesque, 1832, and *Pyxidemyx* Fitzinger, 1835.

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